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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,813	10/25/2000	Apostolos Voutsas	SLA 0468	3618

7590 10/08/2002
David C Ripma Patent Counsel
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EXAMINER

NGUYEN, KHIEM D

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 10/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/696,813

Applicant(s)

VOUTSAS ET AL.

Examiner

Khiem D Nguyen

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 12 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 12 and 20-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10-25-2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (U.S. Patent 5, 569, 610) in view of the applicant's admitted prior art (AAPA) and Venkatesan et al. (U.S. Patent 5, 371, 382).

Zhang teaches a method of fabricating a polysilicon film, comprising the steps of
(See figures 1A-1E, 2A-2E, 4A-4E, and 5A-5E and col. 2, line 65 to col. 3, line 53):


providing a substrate;

depositing an amorphous silicon film by the process of physical vapor deposition
such as sputtering on the substrate;

introducing a metal catalyst chosen from the group consisting of nickel, cobalt,
and palladium into the amorphous silicon film; and ,

annealing the amorphous silicon film with an excimer laser to form a crystallized
region in a liquid crystal display by pure metal induced crystallization where each thin
film transistor (TFT) is to be fabricated.

Zhang teaches introducing metal catalyst into the amorphous silicon film but fails
to teach the introduction of metal catalyst into the amorphous silicon film is done through
a barrier layer having windows as required by present 12.



However, AAPA teaches a method of fabricating a poly-silicon film in which the metal catalyst is introduced into an amorphous silicon film through a barrier layer having windows. See page 3 of the Background of the Invention.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to introduce the metal catalyst into the amorphous silicon film through a barrier layer having windows in Zhang's method because that allows the formation of TFT devices. See page 3 of the Background of the Invention.

Zhang fails to teach that the amorphous silicon film is deposited using Argon as a sputtering gas as recited in present claims 5 and 6.

However, Venkatesan teaches a method in which an amorphous silicon film is formed by sputtering using Argon gas. See col. 6, lines 5-20.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate Venkatesan's teaching into Zhang's method to form the amorphous silicon film by sputtering using Argon gas because in doing so the amorphous silicon film having uniform concentration can be obtained. See col. 6, lines 25-30.

Zhang and Venkatesan fail to teach the ranges of the Argon content in the amorphous silicon film and in the crystallized region, the annealing temperature and time duration, and the front length of a crystallization growth produces in the annealing step as recited in present claims 5-8.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal ranges of the Argon

content in the amorphous silicon film and in the crystallized region, the annealing temperature and time duration, and the front length of a crystallization growth produces in the annealing step through routine experimentation and optimization to obtain optimal or desired device performance because the ranges of the Argon content in the amorphous silicon film and in the crystallized region, the annealing temperature and time duration, and the front length of a crystallization growth produces in the annealing step are result-effective variable and there is no evidence indicating that the ranges of the Argon content in the amorphous silicon film and in the crystallized region, the annealing temperature and time duration, and the front length of a crystallization growth produces in the annealing step are critical and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

3. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (U.S. Patent 5, 569, 610).

Zhang teaches a method of fabricating a polysilicon film, comprising the steps of (See figures 1A-1E, 2A-2E, 4A-4E, and 5A-5E and col. 2, line 65 to col. 4, line 3):

providing a substrate;

depositing an amorphous silicon film by the process of physical vapor deposition such as sputtering on the substrate;

depositing a metal catalyst film on the amorphous silicon film; and

annealing the amorphous silicon film and the metal catalyst film to form a crystallized region film by pure metal induced crystallization.

Zhang teaches annealing the amorphous silicon film and the metal catalyst film at a temperature and time duration (col. 4, lines 1-3) but fails to teach the ranges for the annealing temperature and time duration as recited in present claim 20.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal ranges for the annealing temperature and time duration through routine experimentation and optimization to obtain optimal or desired device performance because the annealing temperature and time duration are result-effective variables and there is no evidence indicating that the annealing temperature and time duration are critical and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

4. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (U.S. Patent 5, 569, 610).

Zhang teaches a method of fabricating a polysilicon film, comprising the steps of (See figures 1A-1E, 2A-2E, 4A-4E, and 5A-5E and col. 2, line 65 to col. 4, line 3):

providing a substrate;

depositing an amorphous silicon film by the process of physical vapor deposition such as sputtering on the substrate;

depositing a metal catalyst film on selected regions of the amorphous silicon film after depositing the amorphous silicon film; and

annealing the amorphous silicon film and the metal catalyst film to form a crystallized silicon film by pure metal induced crystallization in the selected regions.

Responding to applicant's Arguments

Applicant's arguments filed 7-29-2002 have been fully considered but they are not persuasive.

In response to applicant's argument that Zhang (U.S. '610) does not teach or suggest a PVD process.

Examiner disagreed. Zhang teaches forming the amorphous silicon film by physical vapor deposition such as sputtering (See col. 2, line 66 to col. 3, line 2).

Applicants further argued that Zhang's teaching (col. 2, lines 67 to col. 3, line 2) which states "when the amorphous silicon film is formed by physical vapor deposition such as sputtering, the catalytic material may be added to the target or evaporation source for forming a film" appears to be a typographical error.

Examiner disagreed. It is impossible for the above statement to be a typographical error because sputtering is one type of physical vapor deposition.

Examiner agreed that Venkatsan (U.S. '382) does not teach "introducing a metal catalyst to the amorphous silicon film". However, Zhang teaches depositing a metal catalyst film to the amorphous silicon film (See the Rejection). Examiner only used Venkatsan as a secondary reference in combination with Zhang to reject claims 5-6, which recited that the amorphous silicon film is deposited using Argon as a sputtering gas (See col. 6, lines 5-20).

Applicant's arguments on the dependent claims 7-8 have been fully considered but they are not persuasive because it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05. See the Rejection.

Applicant's arguments on the dependent claim 12 have been fully considered but they are not persuasive because even though none of the cited references teach or suggest, "providing a barrier layer on said amorphous silicon film where said barrier layer includes a window therein for the introduction of said catalyst to said amorphous silicon film". AAPA teaches a method of fabricating a poly-silicon film in which the metal catalyst is introduced into an amorphous silicon film through a barrier layer having windows. See page 3 of the Background of the Invention. See the Rejection.

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

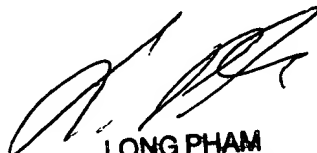
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2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
October 3, 2002



LONG PHAM
PRIMARY EXAMINER